

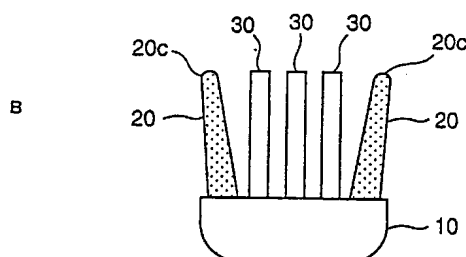
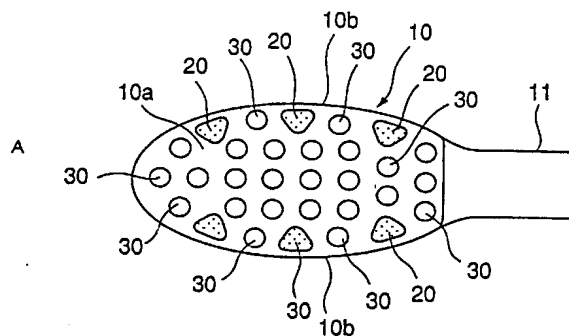
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>7</sup> : A46B 9/06, 15/00	A1	(11) International Publication Number: <b>WO 00/64307</b> (43) International Publication Date: 2 November 2000 (02.11.00)
(21) International Application Number: PCT/JP00/01737 (22) International Filing Date: 22 March 2000 (22.03.00) (30) Priority Data: 11/114824 22 April 1999 (22.04.99) JP 11/114825 22 April 1999 (22.04.99) JP 11/114826 22 April 1999 (22.04.99) JP 11/114827 22 April 1999 (22.04.99) JP (71) Applicant (for all designated States except US): KAO CORPORATION [JP/JP]; 14-10, Nihonbashikayabacho 1-chome, Chuo-ku, Tokyo 103-8210 (JP). (72) Inventors; and (75) Inventors/Applicants (for US only): SUZUKI, Akira [JP/JP]; Kao Corporation Research Laboratories, 1-3, Bunka 2-chome, Sumida-ku, Tokyo 131-8501 (JP). MAEDA, Kouji [JP/JP]; Kao Corporation Research Laboratories, 1-3, Bunka 2-chome, Sumida-ku, Tokyo 131-8501 (JP). MIURA, Eiki [JP/JP]; Kao Corporation Research Laboratories, 2606, Akabane, Ichikaimachi, Haga-gun, Tochigi 321-3497 (JP). IMAI, Naoki [JP/JP]; Kao Corporation Research Laboratories, 2606, Akabane, Ichikaimachi, Haga-gun, Tochigi 321-3497 (JP). KUBO, Mitsuyuki		[JP/JP]; Kao Corporation Research Laboratories, 2606, Akabane, Ichikaimachi, Haga-gun, Tochigi 321-3497 (JP). (74) Agents: ARUGA, Mitsuyuki et al.; Kyodo Building, 3-6, Nihonbashiningyocho 1-chome, Chuo-ku, Tokyo 103-0013 (JP). (81) Designated States: CN, US, European patent (DE, FR, GB). Published With international search report.

(54) Title: TOOTHBRUSH

## (57) Abstract

The invention relates to a toothbrush comprising rubber-like bar bristles set with an inclination toward the outside; a toothbrush comprising rubber-like bar bristles set alternately with bristle bundles in an upright position with their tips projected from the tips of the bristle bundles; a toothbrush comprising rubber-like bar bristles each having a cross-sectional shape that its face is wider at the peripheral side of a handle head than at the central side thereof; a toothbrush comprising a mixed bristle part composed of rubber-like bar bristles and soft bristle bundles, said mixed part being formed in a peripheral portion on the bristle-setting surface, and hard bristle bundles set in the central portion; and a toothbrush comprising rubber-like bar bristles set with the bases thereof connected to each other only on the side of the back surface of a handle head. According to the toothbrushes of the invention, a high massaging effect on gums, particularly, peripheries and papillae thereof is achieved, to say nothing of removal of sordes on teeth.



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## DESCRIPTION

## TOOTHBRUSH

## 5 TECHNICAL FIELD

The present invention relates to toothbrushes capable of effectively massaging gums together with the removal of sordes on teeth, and particularly to toothbrushes having rubber-like bar bristles for massaging  
10 gums.

## BACKGROUND ART

As toothbrushes for massaging gums, there have been known, for example, a toothbrush provided with tongue  
15 piece-like rubber massaging members into longitudinal edge portions on the bristle-setting surface of a handle head (Japanese Utility Model Application Laid-Open No. 1738/1972), a toothbrush provided with rubber-made bristles the tips of which are curved outward (Japanese  
20 Utility Model Application Laid-Open No. 35527/1987), etc. However, these toothbrushes have involved the following respective problems. In the case of the former toothbrush, its massaging effect on gums can be scarcely achieved when the teeth are brushed in vertical and oblique directions,  
25 setting aside the brushing in lateral directions, since the rubber massaging members are in the form of a tongue piece and projected only up to a position lower than

bristle bundles. In the case of the latter toothbrush, force is hard to transmit to gums because the tips of the rubber-made bristles are curved from the beginning, and so only low massaging effect can be achieved. There has not  
5 been yet achieved under the circumstances any fully satisfactory massaging effect on gums by the conventional toothbrushes.

It is an object of the present invention to provide a toothbrush which can solve such problems of the  
10 conventional toothbrushes as described above and achieve a high massaging effect on gums, particularly, peripheries and papillae thereof.

#### DISCLOSURE OF THE INVENTION

15 The above object of the present invention can be achieved by a toothbrush comprising rubber-like bar bristles set with an inclination toward the outside into at least parts of longitudinal edge portions on the bristle-setting surface of a handle head.

20 The above object of the present invention can also be achieved by a toothbrush comprising rubber-like bar bristles set alternately with bristle bundles in an upright position with their tips projected from the tips of the bristle bundles into at least parts of longitudinal  
25 edge portions on the bristle-setting surface of a handle head.

The above object of the present invention can

further be achieved by a toothbrush comprising rubber-like bar bristles each having a cross-sectional shape that its face is wider at the peripheral side of a handle head than at the central side thereof, which are set into at least  
5 parts of longitudinal edge portions on the bristle-setting surface of the handle head.

The above object of the present invention can still further be achieved by a toothbrush comprising a mixed bristle part composed of rubber-like bar bristles and  
10 bristle bundles having softness to an extent that gums are not damaged, said mixed part being formed in a peripheral portion on the bristle-setting surface of a handle head, and a bristle part composed of bristle bundles harder than the bristle bundles set in the peripheral portion, said  
15 bristle part being formed in the central portion on the bristle-setting surface of the handle head.

The above object of the present invention can yet still further be achieved by a toothbrush comprising rubber-like bar bristles, the bases of which are connected  
20 to each other only on the side of the back surface of a handle head, set into at least parts of the bristle-setting surface of the handle head.

#### BRIEF DESCRIPTION OF THE DRAWINGS

25 Figs. 1A and 1B illustrate a toothbrush according to a first embodiment of the present invention, Fig. 1A is a schematic plan view illustrating a handle head thereof,

and Fig. 1B is a schematic side elevation thereof viewed from the left side.

Fig. 2 is an enlarged cross-sectional view illustrating an example of a rubber-like bar bristle.

5 Figs. 3A and 3B illustrate a toothbrush according to a second embodiment of the present invention, Fig. 3A is a schematic plan view illustrating a handle head thereof, and Fig. 3B is a schematic side elevation thereof viewed from the left side.

10 Figs. 4A and 4B illustrate a toothbrush according to a third embodiment of the present invention, Fig. 4A is a schematic plan view illustrating a handle head thereof, and Fig. 4B is a schematic side elevation thereof viewed from the left side.

15 Fig. 5 is a schematic plan view illustrating a handle head of a toothbrush according to a fourth embodiment of the present invention.

Fig. 6 is a sectional view illustrating principal parts in a handle head of a toothbrush according to a  
20 fifth embodiment of the present invention.

Figs. 7A, 7B and 7C illustrate setting examples of rubber-like bar bristles, Figs. 7A and 7B are sectional views illustrating principal parts in a handle head, in which rubber-like bar bristles are set in connection with  
25 each other at both sides of the handle head, and Fig. 7C is a sectional view illustrating principal parts in a handle head, in which rubber-like bar bristles are set

independently of each other.

Description of characters:

10: Handle head

10a: Bristle-setting surface

5 10b: Longitudinal edge portion

10c: Front end

10d: End on a handle side

10e: Back surface

11: Handle

10 12: Through-hale

20: Rubber-like bar bristle

20a: Base

20b: Bristle part

20c: Bristle top (tip)

15 21: Connecting member

30: Bristle bundle

30a: Bristle bundle (soft)

30b: bristle bundle (hard)

20 BEST MODE FOR CARRYING OUT THE INVENTION

When rubber-like bar bristles are set with an inclination toward the outside in the present invention, the angle of inclination is preferably 2 to 15°, particularly 2 to 5° in an outside direction of a

25 longitudinal edge of a handle head based on a line perpendicular to the bristle-setting surface of the handle head. In this case, it is advantageous that at least parts

of the rubber-like bar bristles are projected from the tips of the bristle bundles set into the bristle-setting surface, since they become easy to strike on peripheral gingivae and interdental papillae, so that the peripheries and papillae of gums can be massaged at the same time and with high efficiency. By the way, the degree of the projection is preferably about 0.5 to 3.0 mm. In this case, it is further desirable from the viewpoint of achieving a more effective massaging effect that the rubber-like bar bristles be set alternately with the bristle bundles into at least parts of longitudinal edge portions on the bristle-setting surface, since the rubber-like bar bristles are prevented from being concentrated at one place, so that they become easy to reach interdental papillae.

On the other hand, when the rubber-like bar bristles are not inclined in the outside direction, they are preferably set alternately with bristle bundles in an upright position with their tips projected from the tips of the bristle bundles by about 0.5 to 3.0 mm into at least parts of longitudinal edge portions on the bristle-setting surface.

When rubber-like bar bristles each having a cross-sectional shape that its face is wider at the peripheral side of a handle head than at the central side thereof, are set in the present invention, any rubber-like bar bristles may be used irrespective of their specific shape



so far as they each have a cross-sectional shape that its face is wider at the peripheral side than at the central side in order for the rubber-like bar bristle to be easier to deflect in the outside direction of the handle head than in the inside direction thereof upon use. However, those having substantially a triangular or trapezoidal shape in section are particularly preferred because they are excellent in the ability to deflect in the outside direction. In this case, it is also preferred from the viewpoint of having a soft feel in the mouth that each corner be suitably rounded. In this case, the rubber-like bar bristles may be in the form of a square bar having the same thickness on the whole. However, it is further preferred from the viewpoint of achieving an excellent massaging effect due to deflection elasticity that the square bar be tapered off upward, and from the viewpoint of having a soft feel like the above that the tip thereof be also suitably rounded.

When a mixed bristle part composed of rubber-like bar bristles and bristle bundles having softness to an extent that gums are not damaged is formed in a peripheral portion on the bristle-setting surface of a handle head, and a bristle part composed of bristle bundles harder than the bristle bundles set in the peripheral portion is formed in the central portion on the bristle-setting surface of the handle head, it is simple and advantageous that a difference in hardness between the bristle bundles

set in the central portion and the bristle bundles set in the peripheral portion is made by, for example, suitably varying the resilience, length or thickness of the bristle bundles set in the central and peripheral portions, or the thickness of the individual bristles making up the bristle bundles irrespective of specific imparting means thereof. In this case, the soft bristle bundles set in the peripheral portion may also be formed in plural rows inward from the peripheral end. However, it is desirable from the viewpoint of achieving a high effect by the hard bristle bundles set in the central portion on removal of sordes on teeth that the soft bristle bundles be formed in only a row of the outermost row along the periphery of the bristle-setting surface. In this case, the rubber-like bar bristles set in combination with the soft bristle bundles set in the peripheral portion may be set over the overall periphery of the bristle-setting surface. However, it is further preferred from the viewpoint of achieving an efficient massaging effect on gums that they be set in only longitudinal edge portions on the bristle-setting surface.

When rubber-like bar bristles are set with the bases thereof connected to each other only on the side of the back surface of a handle head, it is preferred that a connected member of rubber-like bar bristles the bases of which have been connected to each other be set into the handle head in such a manner that the bristle parts of the

connected member are fitted into through-holes cut in the handle head from the side of the back surface of the handle head so as to project from the bristle-setting surface, since they can be set efficiently and certainly.

5

#### EXAMPLES

The present invention will hereinafter be described in further detail with reference to the drawings illustrating embodiments of the present invention.

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Figs. 1A and 1B illustrate a first embodiment.

Rubber-like bar bristles 20, the tips of which have been rounded, are set with an inclination of about  $4^{\circ}$  toward the outside from respective longitudinal edge portions 10b into the longitudinal edge portions 10b opposed to each other on the bristle-setting surface 10a of a handle head 10 connected to the tip of a handle 11. The tips of the rubber-like bar bristles 20 are arranged at substantially the same level as the tips of bristle bundles 30 set in an upright position into the bristle-setting surface 10a, and moreover the rubber-like bar bristles 20 are set alternately with the bristle bundles 30 in the same row at the longitudinal edge portions 10b.

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According to this embodiment, since the rubber-like bar bristle 20 is a straight bar not curved up to the tip, force is easy to apply to gums in all of vertical, lateral and oblique directions, so that a high massaging effect is achieved, and moreover the bar bristles 20 do not prevent

the bristle bundles 30 set into the bristle-setting surface 10a from removing sordes on teeth, since they are inclined toward the outside.

The rubber-like bar bristles 20 each have a cross-sectional shape of substantially a triangular form that its face is wider at the peripheral side of the handle head 10 than at the central side, wherein a corner thereof is opposed to the central side, and a side corresponding to it is located substantially in parallel with the longitudinal edge portion 10b of the handle head 10 in order for the rubber-like bar bristles to be easier to deflect in the outside direction of the handle head 10 than upon use. By the way, the corners of the substantial triangle are suitably rounded so as to have a soft feel.

Fig. 2 illustrates another example of the cross-sectional shape of the rubber-like bar bristle 20. This bar bristle has substantially a trapezoidal shape and is set into the bristle-setting surface with the shorter side 20x of the parallel sides located on the central side of the handle head 10 and with the longer side 20y thereof located on the peripheral side of the handle head 10.

The rubber-like bar bristles 20 are gradually tapered off upward, and tips 20c thereof are rounded. Incidentally, the rubber-like bar bristles 20 may be formed irrespective of materials such as rubber and rubber-like synthetic resins so far as the material has deflection resilience. However, preferable examples of the

material include styrene-butadiene rubber, ethylene-propylene rubber and silicone rubber.

Reference numeral 30 indicates a bristle bundle, and a proper number of the bristle bundles is set into the bristle-setting surface 10a of the handle head 10 as before. Incidentally, as a material for the bristle bundles 30, natural fur or artificial bristles made of nylon, polybutylene terephthalate or the like may be used irrespective of the kind of the material.

Fig. 3 illustrates a second embodiment, and the toothbrush of this embodiment is constructed in the same manner as in the first embodiment illustrated in Figs. 1A and 1B except that the tips of the rubber-like bar bristles 20 are projected by about 2 mm from the tips of the bristle bundles 30 set in an upright position into the bristle-setting surface 10a. More specifically, the rubber-like bar bristles 20 according to this embodiment are set with an inclination toward the outside of the longitudinal edge portions 10b on the bristle-setting surface 10a and with the tips thereof projected from the bristle bundles 30.

According to this embodiment, a far excellent massaging effect on peripheries and papillae of gums is achieved, since the rubber-like bar bristles 20 are projected from the bristle bundles 30.

Fig. 4 illustrates a third embodiment, and the toothbrush of this embodiment is constructed in the same

manner as in the second embodiment illustrated in Figs. 3A and 3B except that the rubber-like bar bristles 20 are set in an upright position into the bristle-setting surface 10a without inclining them. More specifically, the rubber-like bar bristles 20 according to this embodiment are set alternately with bristle bundles 30 in an upright position into the bristle-setting surface 10a with the tips thereof projected from the tips of the bristle bundles 30.

According to this embodiment, an excellent massaging effect on peripheries and papillae of gums is achieved, since the rubber-like bar bristles 20 are prevented from being concentrated at one place, and projected from the tips of the bristle bundles 30.

Fig. 5 illustrates a fourth embodiment, wherein bristle bundles 30a having softness to an extent that gums are not damaged and rubber-like bar bristles 20 are set alternately with each other by only one row in the same row along the periphery of the bristle-setting surface 10a excluding an end 10d of the bristle-setting surface 10a on the handle side. By the way, the rubber-like bar bristles 20 are set only into longitudinal edge portions 10b opposed to each other on the bristle-setting surface 10a, and not set into the front end 10c and the end 10d on the handle side.

A proper number of bristle bundles 30b prepared harder than the bristle bundles 30a set into the peripheral portion is set into the other portion on the

bristle-setting surface 10a, i.e., the central portion so as to achieve a sufficient effect on removal of sordes on teeth. In this embodiment, a difference in hardness between the bristle bundles 30b set in the central portion and the bristle bundles 30a set in the peripheral portion is made by suitably varying the resilience, length or thickness of the bristle bundles as described above.

Incidentally, as materials for the bristle bundles 30a and 30b, natural fur or artificial bristles made of nylon, polybutylene terephthalate or the like may be used irrespective of the kind of the material as described above.

According to this embodiment, besides the fact that gums can be effectively massaged by the rubber-like bar bristles 20, the gums are not damaged because the bristle bundles 30a set into the peripheral portion are soft, and moreover a high effect can be achieved on removal of sordes on teeth because the bristle bundles 30b set in the central portion are hard.

Fig. 6 illustrates a fifth embodiment, wherein the bases 20a of the rubber-like bar bristles 20 set into the longitudinal edge portions 10b on the bristle-setting surface 10a are connected to each other only on the side of the back surface 10e of the handle head 10 through a connecting member 21. A material for the connecting member 21 may be different from the above-described material for the rubber-like bar bristles 20. However, the same

material is preferably used to integrally mold both.

Such a toothbrush can be produced with extreme efficiency by fitting a connected member of plural rubber-like bar bristles 20, the bases 20a of which have been  
5 connected to each other through the connecting member 21, into through-holes 12 cut in advance in the handle head 10, into which the bristle bundles 30 have been set, from the side of the back surface 10e of the handle head 10 so as to project the bristle parts 20b of the rubber-like bar  
10 bristles 20 from the bristle-setting surface 10a, thereby setting the connected member into the handle head 10.

According to this embodiment, since the bristle-setting surface 10a of the handle head 10 are exposed between the rubber-like bar bristles 20, the bristle  
15 bundles 30 can also be set between the rubber-like bar bristles 20, so that the setting area of the bristle bundles is prevented from being extremely narrowed like the toothbrushes illustrated in Figs. 7A and 7B. Therefore, the toothbrush does not interfere with the effect of the  
20 bristle bundles on removal of sordes on teeth, and moreover, a higher gum-massaging effect can be brought about by the rubber-like bar bristles 20. In addition, since the respective rubber-like bar bristles 20 are connected to each other on the side of the back surface  
25 10e of the handle head 10, the rubber-like bar bristles 20 are prevented from falling off like the toothbrush illustrated in Fig. 7C.



## INDUSTRIAL APPLICABILITY

When the toothbrushes according to the present invention are used, a high massaging effect on gums, particularly, peripheries and papillae thereof can be achieved by the elastic sliding action of the rubber-like bar bristles, to say nothing of removal of sordes on teeth. Therefore, the toothbrushes also have an excellent effect on improvement and prevention of gingivitis and the like.

## CLAIMS

1. A toothbrush comprising rubber-like bar bristles set with an inclination toward the outside into at least  
5 parts of longitudinal edge portions on the bristle-setting surface of a handle head.

2. The toothbrush according to Claim 1, wherein at least parts of the rubber-like bar bristles are projected from the tips of bristle bundles set into the bristle-  
10 setting surface.

3. The toothbrush according to Claim 1, wherein the rubber-like bar bristles and the bristle bundles are set alternately with each other into at least parts of the longitudinal edge parts on the bristle-setting surface.

15 4. A toothbrush comprising rubber-like bar bristles set alternately with bristle bundles in an upright position with their tips projected from the tips of the bristle bundles into at least parts of longitudinal edge portions on the bristle-setting surface of a handle head.

20 5. A toothbrush comprising rubber-like bar bristles each having a cross-sectional shape that its face is wider at the peripheral side of a handle head than at the central side thereof, which are set into at least parts of longitudinal edge portions on the bristle-setting surface  
25 of the handle head.

6. A toothbrush comprising a mixed bristle part composed of rubber-like bar bristles and bristle bundles

having softness to an extent that gums are not damaged, said mixed part being formed in a peripheral portion on the bristle-setting surface of a handle head, and a bristle part composed of bristle bundles harder than the  
5 bristle bundles set in the peripheral portion, said bristle part being formed in the central portion on the bristle-setting surface of the handle head.

7. The toothbrush according to Claim 6, wherein a difference in hardness between the bristle bundles set in  
10 the central portion and the bristle bundles set in the peripheral portion is made by varying the resilience, length or thickness of the bristle bundles, or the thickness of the individual bristles making up the bristle bundles.

15 8. The toothbrush according to Claim 6, wherein the bristle bundles set in the peripheral portion are formed in only a row of the outermost row along the periphery of the bristle-setting surface.

20 9. A toothbrush comprising rubber-like bar bristles, the bases of which are connected to each other only on the side of the back surface of a handle head, set into at least parts of the bristle-setting surface of the handle head.

25 10. The toothbrush according to Claim 9, wherein a connected member of the rubber-like bar bristles, the bases of which have been connected to each other is set into the handle head in such a manner that the bristle

parts of the connected member are fitted into through-holes cut in advance in the handle head from the side of the back surface of the handle head so as to project from the bristle-setting surface.

Fig. 1

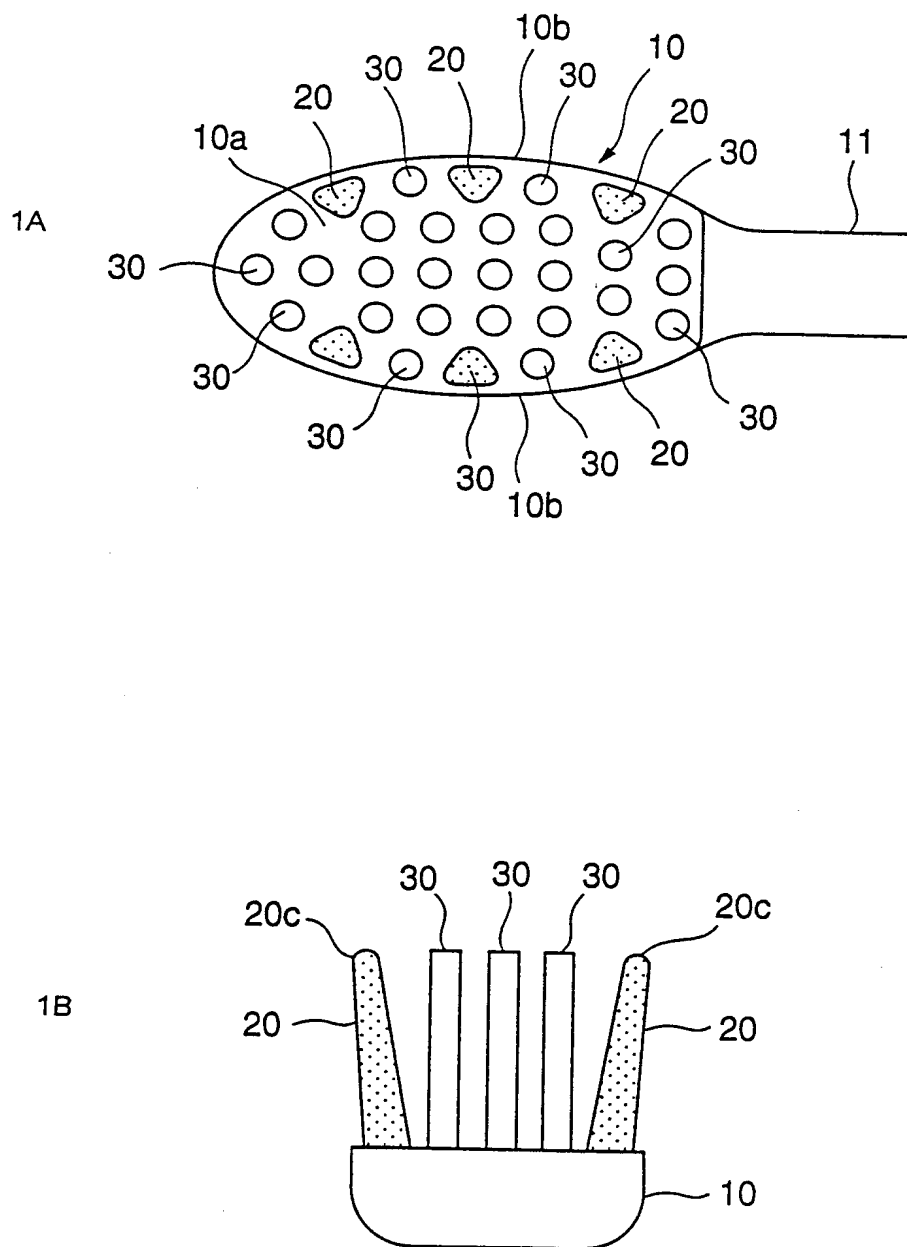


Fig. 2

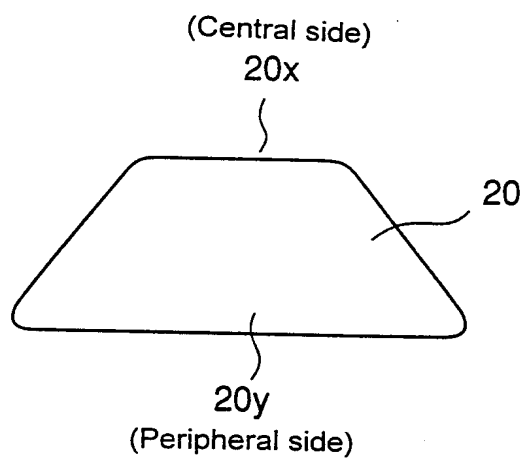


Fig. 3

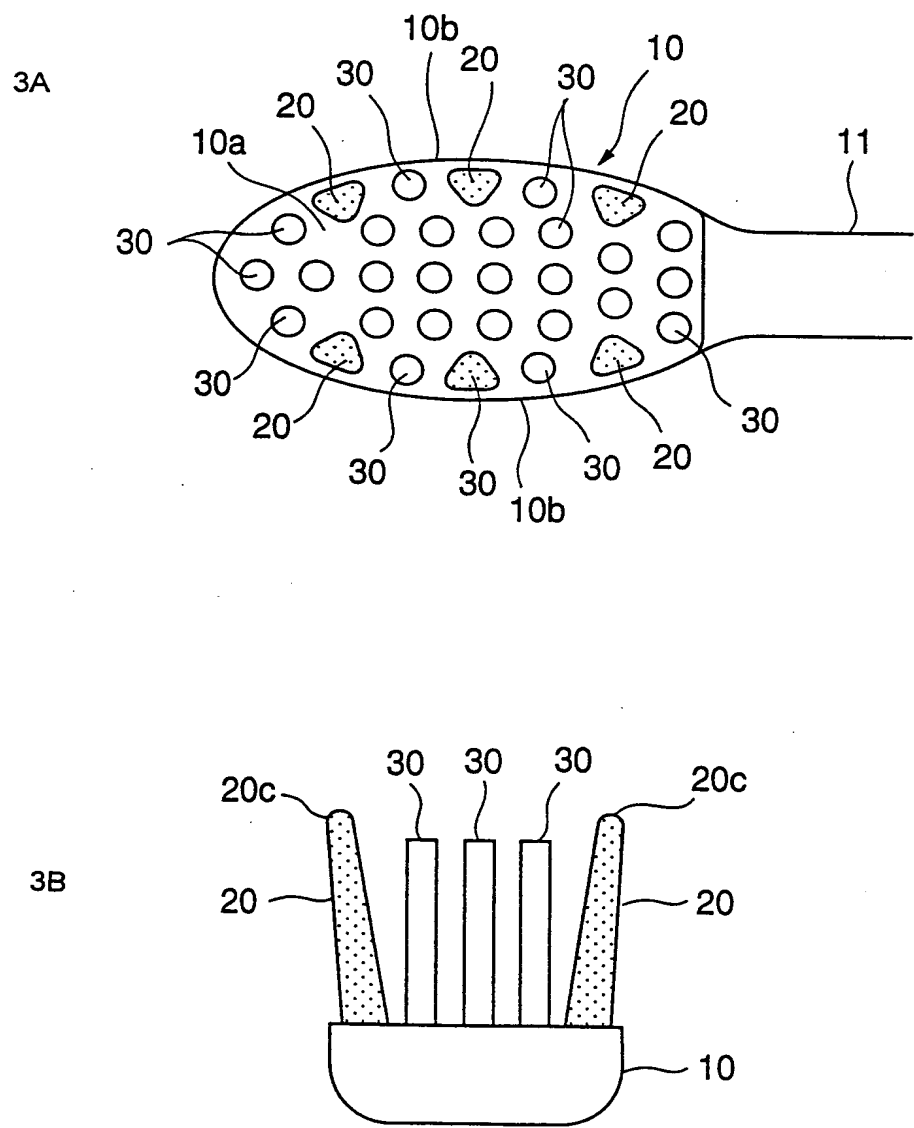


Fig. 4

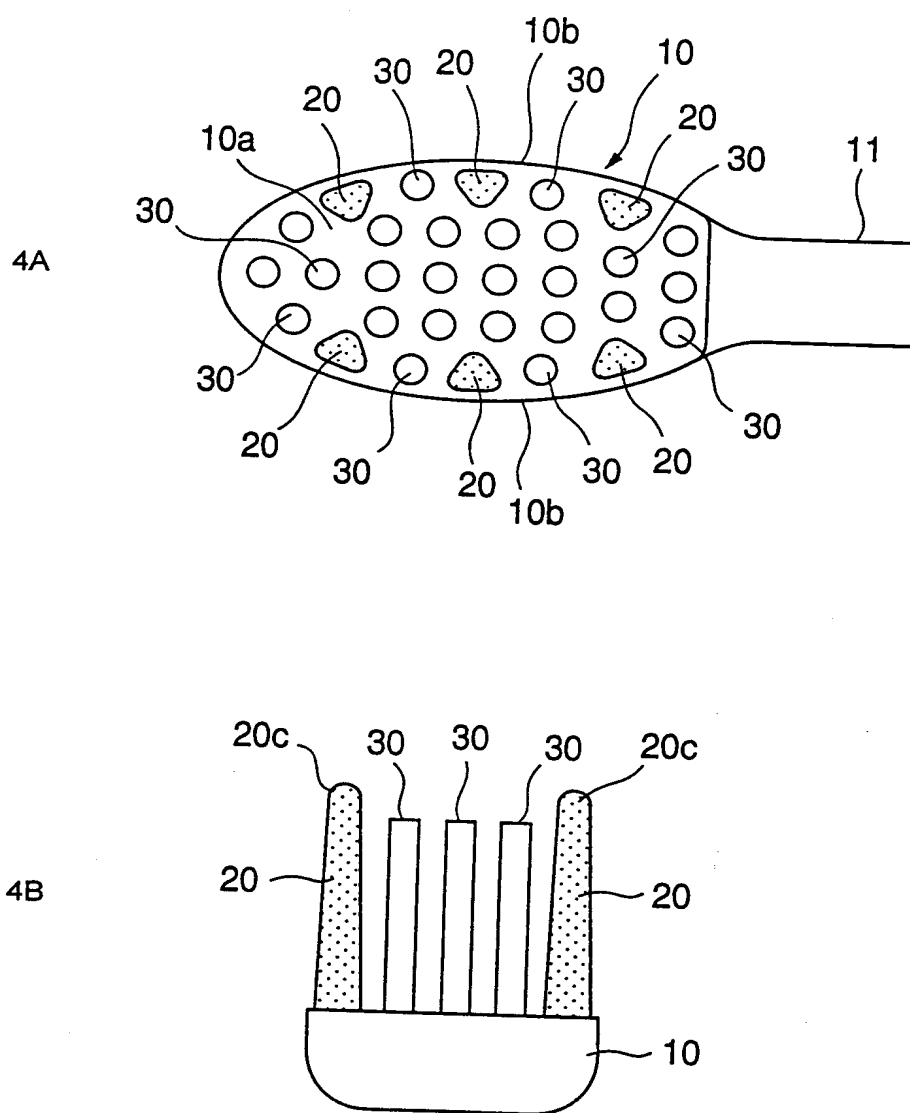




Fig. 5

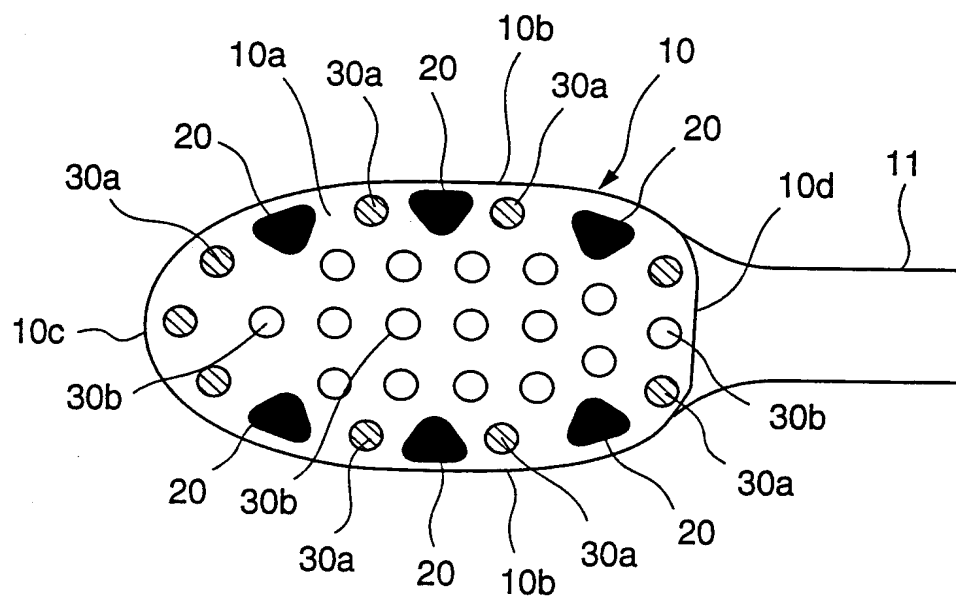


Fig. 6

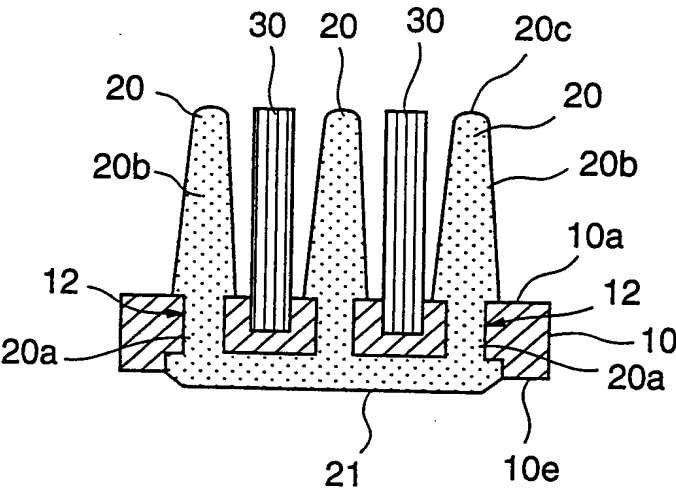
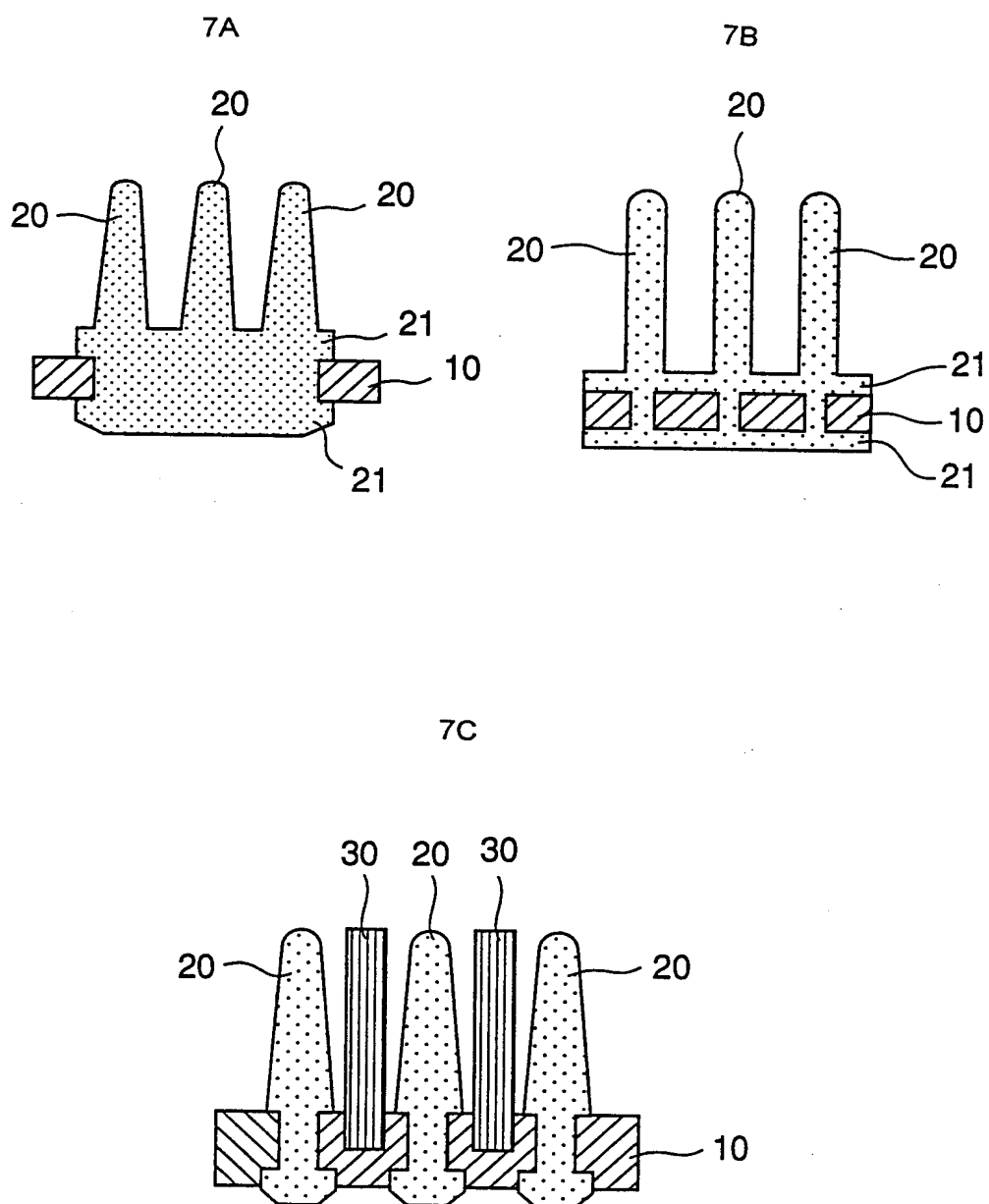


Fig. 7



# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/JP 00/01737

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 A46B9/06 A46B15/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 A46B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2 042 239 A (PLANDING) 26 May 1936 (1936-05-26) page 1, right-hand column, line 13 -page 1, left-hand column, line 17; figures ----	1-10
A	US 1 924 152 A (CONEY) 29 August 1933 (1933-08-29) page 1, line 43 -page 2, line 41; figures ----	1-10
P, A	FR 2 773 962 A (SYNTHELABO) 30 July 1999 (1999-07-30) page 4, line 8 -page 9, line 15; figures -----	1-10

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Date of the actual completion of the international search

28 June 2000

Date of mailing of the international search report

06/07/2000

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 00/01737

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